

Modified Form PTO-1390 (11-98)

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

ATTORNEY'S DOCKET NUMBER
USPL-77

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

10/069695

INTERNATIONAL APPLICATION NO.
PCT/US00/23124

INTERNATIONAL FILING DATE
23 August 2000 (23.08.00)

PRIORITY DATE CLAIMED
24 August 1999 (24.08.99)

TITLE OF INVENTION SCREEN FOR REAR PROJECTION DISPLAY

APPLICANT(S) FOR DO/EO/US Roy Auerbach, Joachim Bunkenburg, Brahim Dahmani, E. Gregory Fulkerson, Simon Magarill,
and John D. Rudolph

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☒ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
(see Express Mail Information)

[222] Attorney Docket No. :USPL-77

PCT

IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)

International Appl. No. : PCT/US00/23124
International Filing Date : 23 August 2000 (23.08.00)
Priority Date Claimed : 24 August 1999 (24.08.99)
Title of Invention : SCREEN FOR REAR PROJECTION DISPLAY
U.S. Serial No. : Not Yet Assigned
Applicant (U.S.) : Roy Auerbach, Joachim Bunkenburg,
Brahim Dahmani, E. Gregory Fulkerson,
Simon Magarill, and John D. Rudolph

BOX PCT
COMMISSIONER OF PATENTS AND TRADEMARKS
WASHINGTON, D.C. 20231
ATTENTION: DO/EO/US

PRELIMINARY AMENDMENT

Prior to its initial examination, please amend the above-identified application as follows:

IN THE SPECIFICATION

Please insert the following before the first line of the specification:

CROSS REFERENCE TO RELATED APPLICATIONS

This application is the U.S. national phase under 35 USC §371 of International Application No. PCT/US00/23124, filed August 23, 2000, which was published in English under PCT Article 21(2) on March 1, 2001 as International Publication No. WO 01/14927. This application claims the benefit under 35 USC §119(e) of U.S. Provisional Application No. 60/150,451 filed August 24, 1999, the contents of which in its entirety is hereby incorporated by reference.

Respectfully submitted,

Date: 2/21/02

Maurice Klee
Maurice M. Klee, Ph.D.
Reg. No. 30,399
Attorney for Applicant
1951 Burr Street
Fairfield, CT 06430
(203) 255-1400

[222] Attorney Docket No. :USPL-77

PCT

IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
(DO/EO/US)

International Appl. No. : PCT/US00/23124
International Filing Date : 23 August 2000 (23.08.00)
Priority Date Claimed : 24 August 1999 (24.08.99)
Title of Invention : SCREEN FOR REAR PROJECTION DISPLAY
U.S. Serial No. : Not Yet Assigned
Applicant (U.S.) : Roy Auerbach, Joachim Bunkenburg,
Brahim Dahmani, E. Gregory Fulkerson,
Simon Magarill, and John D. Rudolph

BOX PCT
COMMISSIONER OF PATENTS AND TRADEMARKS
WASHINGTON, D.C. 20231
ATTENTION: DO/EO/US

LETTER

Attached hereto as Exhibit A is a copy of replacement page 7 which was filed under Rule 34 during the Chapter II international prosecution of this application.

Applicants assume that the examination of this application will be based on the claims which appear on this replacement sheet. If this assumption is incorrect, applicants request that this letter be considered as a **Preliminary Amendment** substituting these claims for the originally filed claims of the above-identified PCT application.

In general terms, the differences between the claims which appear on the replacement sheet and applicants' original claims are as follows:

Claim 1 -- amended

Claims 2-7 -- unchanged

Specifically, Claim 1 appears as follows on the replacement sheet:

-2-

1. (amended) A rear projection screen for use with a projection lens which has an exit pupil, said screen having a light entering side and a light exiting side and comprising in order from said light entering side to said light exiting side:

- (a) a Fresnel structure;
- (b) a lenslet array; and
- (c) an opaque layer comprising a plurality of holes, said holes being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array.

A copy of original Claim 1 annotated to show the differences between the original claim and the replacement claim is attached as Exhibit B.

REMARKS

The above amendment changes the word "pinholes" to the word --holes-- in applicants' Claim 1. Support for this amendment can be found at, for example, page 5, line 3, of applicants' specification.

Examination of this application based on the amended claims is respectfully requested.

Respectfully submitted,

Date: 2/21/02

Maurice Klee
Maurice M. Klee, Ph.D.
Reg. No. 30,399
Attorney for Applicant
1951 Burr Street
Fairfield, CT 06430
(203) 255-1400

Exhibit B
Annotated Copy of Claim 1

1. (amended) A rear projection screen for use with a projection lens which has an exit pupil, said screen having a light entering side and a light exiting side and comprising in order from said light entering side to said light exiting side: -

- (a) a Fresnel structure;
- (b) a lenslet array; and
- (c) an opaque layer comprising a plurality of [pinholes] holes, said holes [pinholes] being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array.

5

SCREEN FOR REAR PROJECTION DISPLAY**I. FIELD OF INVENTION**

This invention relates to rear screen projection systems including
10 CRT, LCD, and DLP displays, as well as slide projectors.

II. BACKGROUND OF THE INVENTION

A projection screen is an optical device which does not create an
image but provides a required field of view in the vertical and horizontal
directions of viewer space. By reducing the field of view in the vertical
15 direction, the screen creates the effect of increasing the brightness of the
image within the viewing area, an effect which is referred to in the art as
gain.

III. SUMMARY OF THE INVENTION

The invention provides a new structure for a compound screen for a
20 rear projection display. More particularly, the invention provides a rear
projection screen for use with a projection lens which has an exit pupil (23
in Figure 3), said screen having a light entering side and a light exiting side
and comprising in order from said light entering side to said light exiting
side:

- 25 (a) a Fresnel structure (11 in Figure 1);
(b) a lenslet array (13 in Figure 1); and
(c) an opaque layer (15 in Figure 1) comprising a plurality of
pinholes, said pinholes being at locations which correspond to the images of
the exit pupil formed by the combination of the Fresnel structure and the
30 lenslet array.

The lenslet array can comprise elements which have a square aperture in which case, in viewer space, the screen's half field of view α can be described by the equation:

$$\alpha = \tan^{-1}(0.5 \cdot CA/f)$$

- 5 where CA and f are, respectively, the clear aperture and the focal length of the elements.

Alternatively, the lenslet array can comprise elements which have a rectangular aperture in which case the screen's vertical half field of view α_v and horizontal half field of view α_H , in viewer space, can be described by the
10 equations:

$$\alpha_v = \tan^{-1}(0.5 \cdot CA_v/f)$$

and

$$\alpha_H = \tan^{-1}(0.5 \cdot CA_H/f)$$

- where CA_v , CA_H , and f are, respectively, the vertical clear aperture, the
15 horizontal clear aperture, and the focal length of the elements.

As a further alternative, the lenslet array can comprise anamorphic elements in which case the screen's vertical half field of view α_v and horizontal half field of view α_H , in viewer space, can be described by the
equations:

20 $\alpha_v = \tan^{-1}(0.5 \cdot CA/f_v)$

and

$$\alpha_H = \tan^{-1}(0.5 \cdot CA/f_H)$$

where CA, f_v , and f_H are, respectively, the clear aperture, the vertical focal length, and the horizontal focal length of the elements.

- 25 The screen can comprise a protective layer on the light exiting side of the opaque layer. The Fresnel structure, the lenslet array, the opaque layer, and the protective layer can be arranged as subassemblies, e.g., the Fresnel structure and the lenslet array can be arranged in one subassembly and the opaque layer and the protective layer can be arranged in another
30 subassembly.

When the screen is used with a pixelized panel, the lenslet array can comprise elements whose size is at least several times smaller than the magnified image of a pixel produced at the array by the projection lens. Similarly, when the screen is used with a cathode ray tube, the lenslet array can comprise elements whose size is at least several times smaller than the magnified image of a dot spot of the cathode ray tube produced at the array by the projection lens.

The accompanying drawings, which are incorporated in and constitute part of the specification, illustrate the various aspects of the invention, and together with the description, serve to explain the principles of the invention. It is to be understood, of course, that both the drawings and the description are explanatory only and are not restrictive of the invention.

IV. BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic drawing of a rear projection screen constructed in accordance with the invention.

Figure 2 is a schematic drawing illustrating the correlation between the size of a lenslet array element and the projected image of a single pixel.

Figure 3 is a conceptual ray tracing for the rear projection screen of Figure 1.

Figure 4 is a schematic drawing illustrating lenslet array elements having a rectangular aperture.

The reference numbers used in the drawings refer to the following:

- 11 Fresnel structure
- 13 lenslet array
- 15 opaque layer with pinholes
- 17 smooth surface of protective layer
- 19 elements of lenslet array
- 21 magnified image of single pixel
- 23 exit pupil of projection lens
- 25 light from projection lens

27 parallel beam

29 light in viewer space

V. DESCRIPTION OF THE INVENTION

The structure of a screen constructed in accordance with the
5 invention is shown in Figure 1.

As shown in this figure, the compound screen has four elements
which are: (1) Fresnel structure 11; (2) lenslet array 13; (3) opaque layer 15
with two dimensional structure of precision pinholes; and (4) a protective
layer having a smooth outer surface 17. These elements can be arranged in
10 two components as shown in Figure 1, where one component is a substrate
with a Fresnel structure on one side and a lenslet array on the other and
the other component has an opaque layer with a pinhole structure on one
side and a smooth second side which serves as a protective layer.

The four elements listed above can be arranged in any combination of
15 subassemblies but must have the following order from the projection lens to
the viewer: Fresnel structure, lenslet array, and opaque layer with
pinholes. The protective layer may not be necessary for all applications or
may be unnecessary with the selection of a suitable opaque layer. When
used, the flat protective layer on the viewer side provides an easy way to
20 clean the screen with typical methods and products for cleaning. Also, this
layer adds abrasion and impact resistance to the screen.

Figure 2 shows a lenslet array where the shape of each element 19 of
the array has a square aperture to collect all light from the projection lens.
As illustrated in this figure, the size of each element 19 is much (at least
25 several times) smaller than the magnified image 21 of a projected pixel of a
LCD/DLP or the dot spot of a CRT. This provides elimination of moiré
effects on the screen.

The work of the screen is illustrated in Figure 3. Light 25 from the
exit pupil 23 of the projection lens illuminates the Fresnel structure which
30 has a front focal distance equal to the distance from the exit pupil of the
projection lens to the screen. This means that after refraction on the

1

1

1

1

1

1

1

1

1

1

1

and developed with an appropriate chemical process. The process of exposure is done after both components of the screen are assembled. The source of the electromagnetic field is located at the position of the exit pupil of the projection lens (see Figure 3). This provides automatic compensation of all inaccuracies in the lenslet array with an appropriate shape and location of the pinholes in the developed opaque layer.

To increase the contrast and reduce the reflection of ambient light in the viewer space the opaque layer can be further improved by the addition of materials which increases the absorption of this layer. All air contact surfaces of the screen can have antireflection coatings that reduce the reflectivity and increase the contrast.

By using identical materials or materials with appropriate thermal coefficients of expansion, the optical properties of the screen can be maintained throughout the temperature and humidity variations which can be expected from seasonal climate conditions and set operation.

From the foregoing, it can be seen that the benefits of the screen design of the invention include:

- elimination of moiré effect;
- full control of vertical and horizontal field of view in viewer space;
- low loss for light propagation from the projection lens to the viewer space and high loss of light (opaque property) in reverse direction; and
- a protective layer on the outside side of the screen.

Although specific embodiments of the invention have been described and illustrated, it will be apparent to those skilled in the art that modifications and variations can be made without departing from the invention's spirit and scope. The following claims are thus intended to cover the specific embodiments set forth herein as well as such modifications, variations, and equivalents.

What is claimed is:

1. A rear projection screen for use with a projection lens which has an exit pupil, said screen having a light entering side and a light exiting side and comprising in order from said light entering side to said light exiting side:

- (a) a Fresnel structure;
- (b) a lenslet array; and
- (c) an opaque layer comprising a plurality of holes, said holes being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array.

2. The screen of Claim 1 wherein the lenslet array comprises elements which have a square aperture.

3. The screen of Claim 2 wherein, in viewer space, the screen has a half field of view α given by:

$$\alpha = \tan^{-1}(0.5 \cdot CA/f)$$

where CA and f are, respectively, the clear aperture and the focal length of the elements.

4. The screen of Claim 1 wherein the lenslet array comprises elements which have a rectangular aperture.

5. The screen of Claim 4 wherein, in viewer space, the screen has a vertical half field of view α_v given by:

$$\alpha_v = \tan^{-1}(0.5 \cdot CA_v/f)$$

and a horizontal half field of view α_h given by:

$$\alpha_h = \tan^{-1}(0.5 \cdot CA_h/f)$$

where CA_v , CA_h , and f are, respectively, the vertical clear aperture, the horizontal clear aperture, and the focal length of the elements.

6. The screen of Claim 1 wherein the lenslet array comprises anamorphic elements.

7. The screen of Claim 6 wherein, in viewer space, the screen has a vertical half field of view α_v given by:

$$\alpha_v = \tan^{-1}(0.5 \cdot CA/f_v)$$

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
1 March 2001 (01.03.2001)

PCT

(10) International Publication Number
WO 01/14927 A1(51) International Patent Classification⁷: **G03B 21/56**

(21) International Application Number: PCT/US00/23124

(22) International Filing Date: 23 August 2000 (23.08.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/150,451 24 August 1999 (24.08.1999) US(71) Applicant (for all designated States except US): **U.S. PRECISION LENS INCORPORATED** [US/US]; 4000 McMann Road, Cincinnati, OH 45245 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **AUERBACH, Roy** [US/US]; 2500 Oak Ridge Drive, Cincinnati, OH 45237 (US). **BUNKENBURG, Joachim** [US/US]; 113 Lynaugh Road, Victor, NY 14564 (US). **DAHMANI, Brahim**[FR/FR]; 5 bis, rue Gabriel Péri, F-92120 Montrouge (FR). **FULKERSON, E., Gregory** [US/US]; 3725 Charterwood Court, Amelia, OH 45102 (US). **MAGARILL, Simon** [US/US]; 9836 Orchardclub Drive, Cincinnati, OH 45242 (US). **RUDOLPH, John, D.** [US/US]; 5815 Ropes Drive, Cincinnati, OH 45244 (US).(74) Agent: **KLEE, Maurice, M.**; Attorney at Law, 1951 Burr Street, Fairfield, CT 06430 (US).

(81) Designated States (national): CN, JP, KR, US.

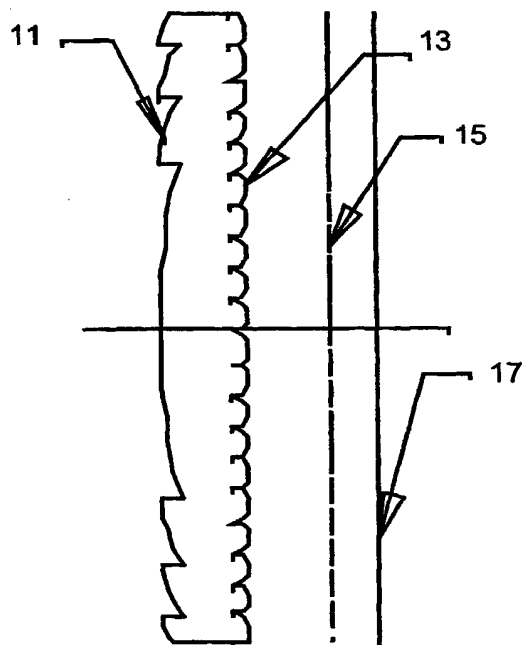
(84) Designated States (regional): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published:

— With international search report.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SCREEN FOR REAR PROJECTION DISPLAY



(57) Abstract: A rear projection screen for use with a projection lens which has an exit pupil (23) is provided. The screen has a light entering side and a light exiting side and comprises in order from said light entering side to said light exiting side: (a) a Fresnel structure (11); (b) a lenslet array (13); and (c) an opaque layer (15) comprising a plurality of pinholes, said pinholes being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array.

1/4

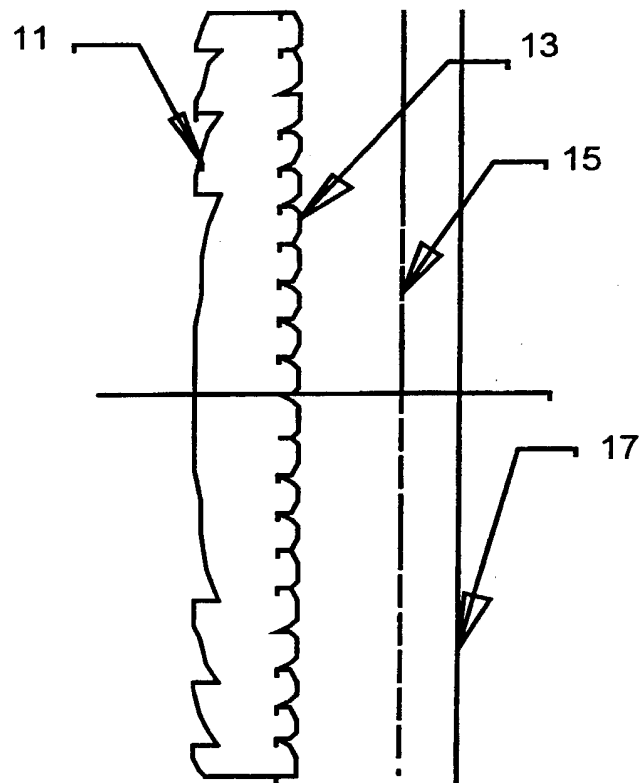


FIG. 1

2/4

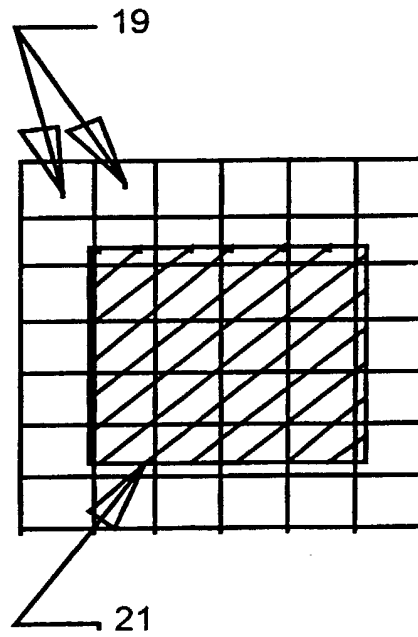


FIG. 2

3/4

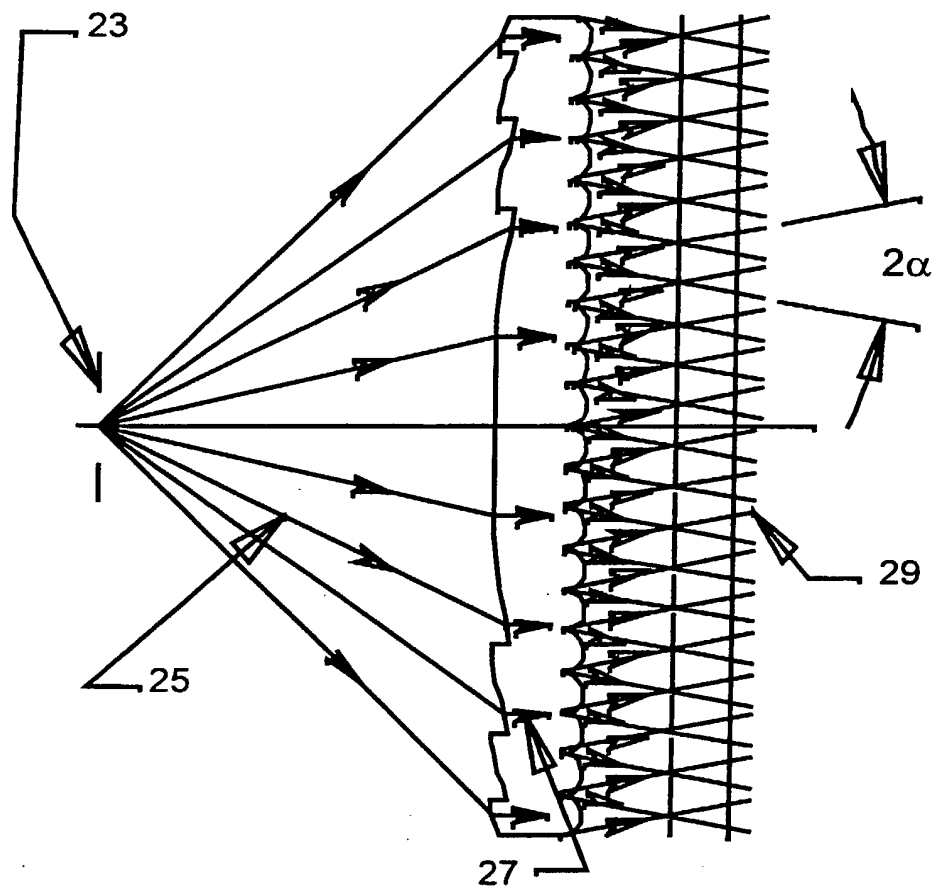


FIG. 3

4/4

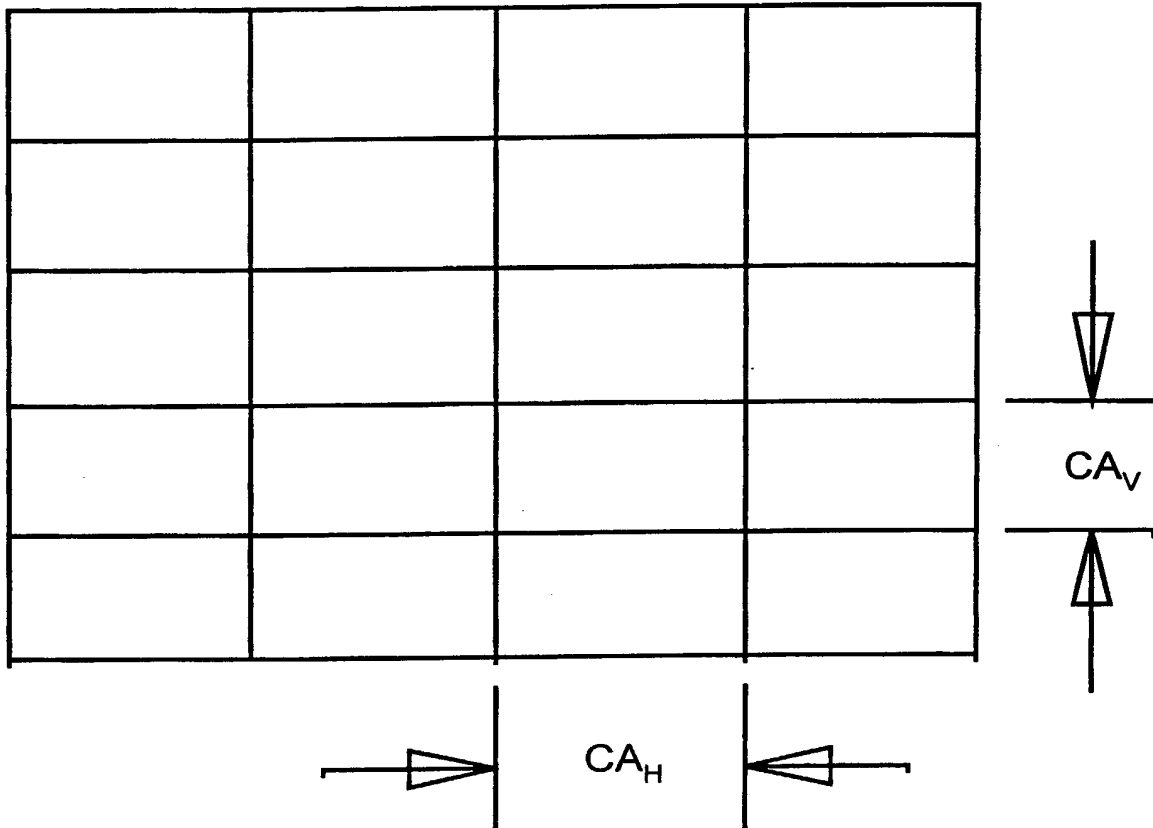


FIG. 4

**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

☐ Declaration Submitted with Initial Filing ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16(e)) required) OR

Attorney Docket Number

USPL-77

First Named Inventor

Auerbach

COMPLETE IF KNOWN

Application Number

Filing Date

Group Art Unit

Examiner Name

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SCREEN FOR REAR PROJECTION DISPLAY

the specification of which

(Title of the Invention)

☐ is attached hereto
OR

☒ was filed on (MM/DD/YYYY) 08/23/2000 as United States Application Number or PCT International

Application Number PCT/US00/23124 and was amended on (MM/DD/YYYY) 03/16/2001 (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.
60/150,451	08/24/1999	

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 10

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.									
U.S. Parent Application or PCT Parent Number				Parent Filing Date (MM/DD/YYYY)			Parent Patent Number (if applicable)		
<input type="checkbox"/> Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.									
As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:									
<input type="checkbox"/> Customer Number 						Place Customer Number Bar Code Label here			
OR <input checked="" type="checkbox"/> Registered practitioner(s) name/registration number listed below									
Name		Registration Number		Name		Registration Number			
Maurice M. Klee Mark W. Lauroesch Alfred L. Michaelsen		<div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">4</div> <u>30,399</u> <u>35,583</u> <u>24,511</u>		Angela N. Nwaneri		<u>34,229</u>			
<input type="checkbox"/> Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.									
Direct all correspondence to: <input type="checkbox"/> Customer Number or Bar Code Label OR <input checked="" type="checkbox"/> Correspondence address below									
<div style="display: flex;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> L-00 </div> <div> Name <u>Maurice M. Klee, Ph.D.</u> </div> </div>									
Address <u>Attorney at Law</u>									
Address <u>1951 Burr Street</u>									
City <u>Fairfield</u>				State <u>CT</u>		ZIP <u>06430</u>			
Country <u>US</u>		Telephone <u>(203) 255-1400</u>		FAX <u>(203) 254-1101</u>					
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.									
Name of Sole or First Inventor:						<input type="checkbox"/> A petition has been filed for this unsigned inventor			
<u>Roy</u>						<u>Auerbach</u>			
Inventor's Signature						Date		<u>May 16, 2002</u>	
Residence: City		<u>Cincinnati OH</u>		State		Country		Citizenship	
Post Office Address <u>2500 Oak Ridge Drive</u>									
Post Office Address									
City		<u>Cincinnati</u>		State		Country		Citizenship	
<input checked="" type="checkbox"/> Additional inventors are being named on the <u>2</u> supplemental Additional Inventor(s) sheets PTO/SB/02A attached hereto.									

DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet

Page 1 of 2

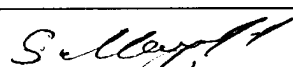
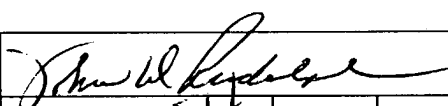
Name of Additional Joint Inventor, if any:						<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name (first and middle (if any))						Family Name or Surname			
Joachim						Bunkenburg			
Inventor's Signature		[Signature]				Date		6/12/2002	
Residence: City		Victor NY		State		NY		Country	
								US	
Post Office Address		113 Lynaugh Road							
Post Office Address									
City		Victor		State		NY		ZIP	
								14564	
								Country	
								US	
Name of Additional Joint Inventor, if any:						<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name (first and middle (if any))						Family Name or Surname			
Brahim						Dahmani			
Inventor's Signature		[Signature]				Date		May 27, 2002	
Residence: City		Montrouge		State				Country	
								FR	
Post Office Address		5 bis rue Gabriel Peri							
Post Office Address									
City		Montrouge		State				ZIP	
								92120	
								Country	
								FR	
Name of Additional Joint Inventor, if any:						<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name (first and middle (if any))						Family Name or Surname			
E. Gregory						Fulkerson			
Inventor's Signature		[Signature]				Date		1/15/02	
Residence: City		Amelia OH		State		OH		Country	
								US	
Post Office Address		3725 Charterwood Court							
Post Office Address									
City		Amelia		State		OH		ZIP	
								45102	
								Country	
								US	

DECLARATION

ADDITIONAL INVENTOR(S)

Supplemental Sheet

Page 2 of 2

Name of Additional Joint Inventor, if any:					<input type="checkbox"/> A petition has been filed for this unsigned inventor						
Given Name (first and middle [if any])					Family Name or Surname						
Simon					Magarill						
Inventor's Signature					Date		05.15.02				
Residence: City		Cincinnati		OH	State	OH	Country	US	Citizenship		US
Post Office Address		9836 Orchardclub Drive									
Post Office Address											
City		Cincinnati		State	OH	ZIP	45242		Country	US	
Name of Additional Joint Inventor, if any:					<input type="checkbox"/> A petition has been filed for this unsigned inventor						
Given Name (first and middle [if any])					Family Name or Surname						
John D.					Rudolph						
Inventor's Signature							Date		5.15.02		
Residence: City		Cincinnati		OH	State	OH	Country	US	Citizenship		US
Post Office Address		5815 Ropes Drive									
Post Office Address											
City		Cincinnati		State	OH	ZIP	45244		Country	US	
Name of Additional Joint Inventor, if any:					<input type="checkbox"/> A petition has been filed for this unsigned inventor						
Given Name (first and middle [if any])					Family Name or Surname						
Inventor's Signature							Date				
Residence: City				State		Country		Citizenship			
Post Office Address											
Post Office Address											
City				State		ZIP			Country		